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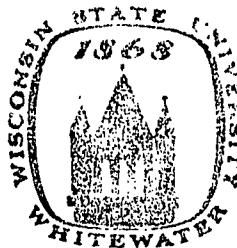
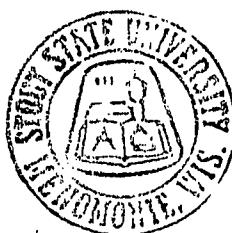
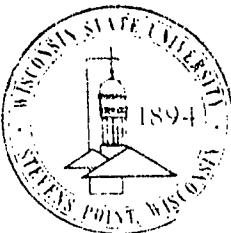
ABSTRACT

To evaluate the effectiveness of a traditional college English program, 100 incoming freshmen (Group A) were requested to postpone freshman English to their sophomore year; another 100 (Group B) were asked to postpone the first term to their sophomore year; another 100 (Group C) were asked to postpone their second term to the sophomore year; and another 100 (Group D) were asked to postpone their third term with the remainder of the freshmen (approximately 600) following the normal sequence. All assignments to experimental groups were randomly made. At the end of the academic year, 244 randomly selected subjects were administered a written proficiency examination, the Brown-Carlson Listening Test, the Iowa Reading test and a language-knowledge test devised by the staff. The data collected were subjected to analysis of variance. Results were: (1) Those students who had not taken the units on the language-knowledge part of the sequence scored low on the test devised to test this material; (2) No differences were noted between the experimental and control groups on the other measures applied; and (3) Women did better than men on all tests. It was concluded that the philosophy, content, and teaching methods of the freshman English sequence need to be reexamined and reevaluated. (Author/CK)

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WSU-CORD



The Wisconsin State Universities Consortium of Research Development

ED054166

Research Report

AN INVESTIGATION OF RELATIVE PERFORMANCE FACTORS IN FRESHMAN ENGLISH AT
WISCONSIN STATE UNIVERSITY - RIVER FALLS

Robert H. Beck
Wisconsin State University - River Falls
River Falls, Wisconsin

Cooperative Research

Wisconsin State Universities
and the
United States Office of Education
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AN INVESTIGATION OF RELATIVE PERFORMANCE FACTORS IN FRESHMAN
ENGLISH AT WISCONSIN STATE UNIVERSITY-RIVER FALLS

Investigator: Robert H. Beck
Wisconsin State University-River Falls
Local Project No. 1

SUMMARY

Since it was reorganized in 1946, Freshman English at WSU-River Falls has tended to emphasize the traditional goals of the effective use of written language, the reading of English with ease and competence, the interpretation and evaluation of the written and spoken language and an examination of language in terms of its function.

To evaluate the effectiveness of the program, 100 incoming freshmen (Group A) were requested to postpone freshman English to their sophomore year, another 100 (Group B) were asked to postpone the first term to their sophomore year, another 100 (Group C) were asked to postpone their second term to the sophomore year, another 100 (Group D) were asked to postpone their third term with the remainder of the freshmen (approximately 600) following the normal sequence. All assignments to experimental groups were randomly made. At the end of the academic year, 244 randomly selected subjects were administered a written proficiency examination, the Brown-Carlson Listening Test, the Iowa Reading Test and a language-knowledge test devised by the staff.

The data collected in the above manner were subjected to analysis of variance with the following general results:

1. Those students who had not taken the units on the language-knowledge part of the sequence scored low on the test devised to test this material.
2. No differences were noted between the experimental groups and the control groups on the other measures applied.
3. Women did better than men on all tests.

Based on the evidence from this study, the philosophy, content and teaching methods of the Freshman English sequence need to be re-examined and re-evaluated.

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FINAL REPORT

WSU-CORD
The Consortium of Research Development
Of The
Wisconsin State Universities

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September 1968

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Wisconsin State University
River Falls, Wisconsin

September 1968

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Introduction

Since 1946, Freshman English at Wisconsin State University - River Falls has evolved as a part of the general education program in the University and has been strongly oriented to intellectual content as well as to the traditional skills. The course has increasingly concentrated on the relationships of language to man's culture and personality, with special attention given to the language of the student's environment. For instance, in the first quarter, which is concerned with the nature of language, the student is introduced through the study of the history of English to the concept that language changes with culture; he learns through a contrast between "traditional" grammar and modern grammar that language has arbitrary form as well as lexical content; he learns through semantics that words and the things that words are "about" are not identical, and through a study of logic that statements have certain relationships to each other in meaningful speech and writing. In the second quarter, the student investigates the relationships between his culture and the language around him with attention to social and regional dialects, to the mass media, to advertising, to the language of politics, and to the language of social control. In the third quarter, the student works with language as a consciously refined and traditional instrument of art in the various genres of literature, not only to "admire" great literature but to gain some of its power of utterance for himself.

The course aims to achieve the following broad and traditional goals:

1. To develop art and ease in the use of written English
2. To read English of a scholarly style with relative ease and competence.
3. To interpret and evaluate written and spoken language with conscious standards.
4. To react appropriately to language in terms of its function.

The English staff was aware that no reliable measurement has ever been made on this campus of what is the achievement of its students who take the course and in the same manner there has been no measure of the

impact of the various quarters of the course on reaching the final objectives.

The following general hypothesis was offered for testing: nine quarter hours of Freshman English as now taught will produce greater achievement of course objectives than six quarter hours or no quarter hours of Freshman English. The English department was principally concerned with testing whether the intellectual content of its present course did contribute noticeably to achievement of its objectives or whether the students' gains in language maturity and usage came about through sheer passage of time. Does, for example, the reading in Freshman English noticeably help the student's comprehension or might he be gaining the same comprehension by reading a history textbook? Subjectively, we have all seen improvement in our students as the school year passed, but objectively, did we know that what we did in Freshman English was an effective factor? Or is the most important thing that happens to a student is that he simply becomes a year older in the college environment?

Dr. Robert Pooley in Teaching English Grammar (1957) and Dr. R. D. Williams in The Teaching of English in Wisconsin (1948) has made us aware that the teaching of traditional grammar alone has probably very little impact on compositional skills--and a survey of such materials as Henry C. Meckel's "Research on Teaching Composition and Literature" in Handbook of Research on Teaching (1963) and R. Braddock, R. Lloyd-Jones, and L. Schoer's Research in Written Composition (1963) has made us aware of the variables in English courses which have been tested in the past. The latter book was found to be most useful despite its modest length; copies were soon acquired for all Freshman English staff members for reading and discussion.

Methods

The procedures and design used in this investigation were based on the following experimental questions:

1. As measured by the evaluative criteria, what was the contribution of English 111 (fall quarter), English 112 (winter quarter), and English 113 (spring quarter)?
2. As measured by the evaluative criteria, what was the difference in impact among English 111, 112, and 113?

In setting up the design of the investigation, the following assumptions were made:

1. The number of available and eligible Freshmen for the fall of 1967 would be approximately 1,000.
2. The random assignment of subjects to the various sub-groups would rule out the necessity for any type of pre-test and matching.

The experimental design can best be described in the following tabular format:

Table 1
The Experimental Design

Group	Approximate Number	Per Cent of Total	Treatment
A	100	10	Postpone all English to Sophomore year
B	100	10	Postpone English 111 to Sophomore year
C	100	10	Postpone English 112 to Sophomore year
D	100	100	Postpone English 113 to Sophomore year
E	600	60	Take English 111, 112, 113 in Freshman year.

At the end of the academic year 244 randomly selected Freshmen were given the following examinations:

1. A writing proficiency examination rated by five readers on six criteria. This resulted in a 7-point rating scale with numerical scores ranging from 7 to 42.
2. The Brown-Carlson Listening Test.
3. The Iowa Reading Test.
4. A language-knowledge test devised by the staff.

These tests were administered by ten pre-trained staff members to the students on the 18th and 20th of May, 1968, in two 2-hour sessions. Clerical help was utilized to grade the Brown-Carlson, the Iowa Reading and the language-knowledge tests. The writing proficiency examination, numbered for individual student identification instead of names to preserve anonymity and rater bias were graded by five English teachers pre-trained by a method used at the University of Iowa to attain agreement on grading methods.

Clerical help was then used to ready the test scores and other background data on each student for the analysis in the Computer Center. Because of incomplete data, twelve subjects were removed from the pool leaving a group of 232 on whom the final analysis was made.

The data were then subjected to an analysis of variance testing equality of:

1. The various sequence pattern groups
2. Sexes
3. Size of high school class of origin
4. Occupational backgrounds of parents
5. Intended majors
6. State vocational professional plans

Findings

The data collected in this study were subjected to an analysis of variance testing equality of: (1) the various sequence pattern groups; (2) sexes; (3) size of high school class of origin; (4) occupational backgrounds of parents; (5) intended majors; and (6) stated vocational-professional plans. Appendix A, pages 7 - 34, contains a summary of the analysis.

On the test of equality over the basic Freshman English groups, no differences were observed on the reading, writing and listening tests. On the test over Freshman English content, the null-hypothesis was rejected at the five per cent level. Group A, those who had not taken any part of the Freshman English sequence, scored low as compared with the other groups. Group D, those not taking English 113, and Group E, those taking the complete sequence, scored high.

On all four tests, women scored significantly higher than men. On the writing, listening, and the content test, this difference was significant at the one per cent level. On the reading test, this sex difference was significant at the five per cent level.

When student groups were compared in terms of the size of the high school from which they had graduated, no differences were observed on any of the four tests. The same statement can be made regarding the occupational backgrounds of the students.

When students were classified by major, no differences were observed on the reading tests and the writing tests. On the listening test, the hypothesis of equality was rejected at the five per cent level, with agriculture majors scoring low. On the content test, agriculture majors and unclassified students scored low, while biology, chemistry, mathematics, physics, business administration, and social science majors scored high. These differences were significant at the one per cent level.

When students were grouped by their vocational-professional plans, no differences were observed on the reading, listening and content tests. On the writing test, students planning careers in the professions, private business, government or as self-employed scored high, while those planning careers in travel or as housewives, or were undecided scored low. This difference was significant at the one per cent level.

At no point in the analysis was a significant inter-reaction observed.

Conclusions and Recommendations

The results of this experiment will have a profound effect on the nature and direction of the current Freshman English program. In summary, the uses to be made of the findings of our study are the following:

1. That on the basis of the various results of our experiment, we revise our syllabus content to meet our announced objectives in Freshman English.
2. That on the basis of our new knowledge of our students' backgrounds, we revise our syllabus content and teaching methods.
3. That on the basis of an analysis of variables in our students' background, we begin to use some predictions for those who might profitably be excused from Freshman English in order to reduce class size or reduce staff need.
4. That self-education for the Freshman English staff in English education continue.
5. And, that a foundation of material and experience be laid upon which to build further testing and refining of the Freshman English curriculum.

We are up against something very complex, involving the nature of gaining language maturity, the pedagogy of Freshman English, the nature of the teachers and students, the interaction of general campus culture and formal studies in the classroom, and discovering and isolating what it is possible to teach in the use of language. We have a hunch that more of the same kinds of work (increased writing, reading, working harder) is not the best to get at the problem, although for this year, that is the immediate direction of revision. We are ending up with more questions than when we started.

During the 1968-69 academic year, the various members of the Freshman English staff will be involved in a series of group sessions in an attempt to interpret the results of the experiment, to devise further ways and means of testing educational assumptions and the educational results. It is hoped that these may be applied during the 1969-70 academic year.

A P P E N D I X A

TABLE I
SUMS, SUMS OF SQUARES AND REDUCTION DATA FOR EACH OF THE
EXPERIMENTAL GROUPS ON THE IOWA READING TEST

Group A		Group B		Group C		Group D		Group E	
Men	Women	Men	Women	Men	Women	Men	Women	Men	Women
23	16	20	18	15	17	13	16	50	44
Sums	4,215	3,028	3,702	3,368	2,772	3,164	2,379	9,150	8,171
SS	776,615	574,748	687,890	631,566	514,706	592,314	436,661	1,682,398	1,525,073
X	183.26	189.25	185.10	187.11	184.80	186.11	183.00	192.50	183.00
ss	4,170.435	1,699.000	2,649.800	1,375.778	2,440.400	3,437.765	1,304.000	1,902.000	7,948.000
									7,681.159

SUMMARY OF THE ANALYSIS OF VARIANCE OF THE
IOWA READING TEST SCORES

Source of Variation	df	S.S.	M.S.	F	F ₀₅	F ₀₁	Hypothesis
Between groups	4	237.161	59.290				Accepted
Between sexes	1	891.168	891.168				Rejected
Interaction	4	449.166	112.291				Accepted
Within	222	34,608.337	155.893				

TABLE II

SUMS, SUMS OF SQUARES AND REDUCTION DATA FOR EACH OF THE EXPERIMENTAL GROUPS
ON THE WRITING PROFICIENCY EXAMINATION

	Group A		Group B		Group C		Group D		Group E	
	Men	Women								
N	23	16	20	18	15	17	13	16	50	44
Sums	1,467	1,155	1,239	1,372	926	1,316	803	1,260	3,193	3,467
SS	97,827	84,845	83,395	106,358	60,098	103,516	52,307	102,598	212,975	282,659
X	63.78	72.18	61.95	76.22	61.73	77.41	61.76	78.75	63.86	78.79
ss	4,257.913	1,468.437	6,638.950	1,781.111	2,932.933	1,642.118	2,706.308	3,373.000	9,070.020	9,475.159

SUMMARY OF ANALYSIS OF VARIANCE OF THE WRITING
PROFICIENCY EXAMINATION SCORES

Source of Variation	df	S.S.	M.S.	F	F ₀₅	F ₀₁	Hypothesis
Between groups	4	242.149	60.537				Accepted
Between sexes	1	9,510.851	9,510.851	48.710	3.89	6.76	Rejected
Interaction	4	424.069	106.017				Accepted
Within	222	43,345.949	195.252				Accepted

TABLE III
SUMS, SUMS OF SQUARES AND REDUCTION DATA FOR EACH OF THE EXPERIMENTAL GROUPS
ON THE BROWN-CARLSON LISTENING COMPREHENSION TEST

Group A		Group B		Group C		Group D		Group E	
Men	Women	Men	Women	Men	Women	Men	Women	Men	Women
N	23	16	20	18	15	17	13	16	44
Sums	1,183	904	1,073	991	791	929	695	925	2,344
SS	61,551	51,772	58,713	55,195	42,191	51,531	37,559	53,843	126,186
X	51.43	56.50	53.65	55.05	52.73	54.64	53.46	57.81	52.52
ss	703.652	696.000	1,146.550	634.944	478.933	763.882	403.231	366.437	2,886.480

SUMMARY OF ANALYSIS OF VARIANCE OF THE BROWN-CARLSON
LISTENING COMPREHENSION TEST SCORES

Source of Variation	df	S.S.	M.S.	F	F ₀₅	F ₀₁	Hypothesis
Between groups	4	156.438	39.109				Accepted
Between sexes	1	349.992	349.992	8.270	3.89	6.76	Rejected
Interaction	4	139.218	34.804				Accepted
Within	222	9,394.836	42.319				

TABLE IV
SUMS, SUMS OF SQUARES AND REDUCTION DATA FOR EACH OF THE EXPERIMENTAL
GROUPS ON THE LANGUAGE KNOWLEDGE TEST

Group A		Group B		Group C		Group D		Group E	
Men	Women	Men	Women	Men	Women	Men	Women	Men	Women
N	23	16	20	15	17	13	16	50	44
Sums	675	470	611	596	458	593	418	564	1,562
SS	20,503	14,506	19,593	20,748	14,306	21,591	13,790	20,400	51,635
\bar{X}	29.34	29.37	30.55	33.11	30.53	34.88	32.15	35.25	35.50
ss	693.217	699.750	926.950	1,013.778	321.733	905.765	349.692	519.000	2,900.580

SUMMARY OF ANALYSIS OF VARIANCE OF THE
LANGUAGE KNOWLEDGE TEST SCORES

Source of Variation	df	S.S.	M.S.	F	F ₀₅	F ₀₁	Hypothesis
Between groups	4	465.384	116.346	2.488	2.41	3.41	Rejected
Between sexes	1	394.966	394.966	8.449	3.89	6.76	Rejected
Interaction	4	119.360	29.840				Accepted
Within	222	10,377.465	46.745				

TABLE V
SUMS, SUMS OF SQUARES AND REDUCTION DATA FOR EACH OF THE EXPERIMENTAL
GROUPS ON THE IOWA READING TEST WHEN CLASSIFIED BY SIZE
OF HIGH SCHOOL ORIGIN

Size of High School Origin	Group A	Group B	Group C	Group D	Group E
0 - 199	N 25 Sums 4,679 SS 880,269 X 187.16 ss 4,547.260	29 5,382 1,001,746 185.58 2,921.034	21 3,921 736,187 186.71 4,080.286	21 3,946 744.104 187.90 2,631.810	61 11,149 2,047.165 182.77 9,456.787
200 - 399	N 7 Sums 1,288 SS 237,868 X 184.00 ss 876.000	4 743 138,167 185.75 154.750	2 395 78,017 197.50 4,500	5 972 189,698 194.40 741.290	18 3,391 642,127 188.38 3,300.278
400 or more	N 7 Sums 1,276 SS 233,226 X 182.29 ss 629.429	5 945 179,543 189.00 938.000	9 1,620 291,816 180.00 216.000	3 541 97,661 180.33 100.667	15 2,781 518,179 185.40 2,581.600

SUMMARY OF ANALYSIS OF VARIANCE

Source of Variation	df	S.S.	M.S.	F	F ₀₅	F ₀₁	Hypothesis
H.S. Size of Origin	2	757.449	378.724	2.476	3.04	4.71	Accepted
Groups	4	178.094	44.523				Accepted
Interaction	8	1,233.418	154.177	1.008	1.98	2.60	Accepted
Within	217	33,179.601	152.901				

TABLE VI
SUMS, SUMS OF SQUARES AND REDUCTION DATA FOR EACH OF THE EXPERIMENTAL
GROUPS ON THE WRITING PROFICIENCY TEST WHEN CLASSIFIED BY SIZE
OF HIGH SCHOOL OF ORIGIN

Size of High School Origin	Group A	Group B	Group C	Group D	Group E
0 - 199	N 25 Sum 1,715 SS 121,003 X 68.60 SS 3,354.000	29 2,014 148,502 69.44 8,633.172	21 1,472 107,842 70.09 4,661.810	21 1,488 110,166 70.85 4,730.581	61 4,319 321,913 70.80 16,113.639
200 - 399	N 7 Sum 441 SS 30,185 X 63.00 SS 2,402.000	4 279 19,833 69.75 372.750	2 168 14,504 84.00 392.000	5 409 35,409 81.80 1,952.800	18 1,267 93,535 70.38 4,352.278
400 or more	N 7 Sum 466 SS 31,484 X 66.57 SS 461.715	5 318 21,418 63.60 1,193.200	9 602 41,268 65.89 1,000.889	3 166 9,330 55.33 144.667	15 1,074 80,186 71.60 3,287.600

SUMMARY OF ANALYSIS OF VARIANCE

Source of Variation	df	S.S.	M.S.	F	F ₀₅	F ₀₁	Hypothesis
H.S. Size of Origin	2	1,394.316	697.158	2.851	3.04	4.71	Accepted
Groups	4	716.579	179.145				Accepted
Interaction	8	2,444.993	305.624	1,250	1.98	2.60	Accepted
Within	217	53,053.091	244.484				

TABLE VII
SUMS, SUMS OF SQUARES AND REDUCTION DATA FOR EACH OF THE EXPERIMENTAL
GROUPS ON THE LISTENING TEST WHEN CLASSIFIED BY SIZE
OF HIGH SCHOOL ORIGIN

Size of High School Origin	Group A	Group B	Group C	Group D	Group E
0 - 199	N 25 Sums 1,322 SS 71,252 \bar{X} 52.88 SS 1,344.640	29 1,578 87,180 54.41 1,315.034	21 1,148 63,486 54.66 728.667	21 1,185 67,577 56.42 709.143	61 3,228 173,038 52.91 2,218.590
200 - 399	N 7 Sums 373 SS 20,011 \bar{X} 53.28 SS 135.429	4 215 11,611 53.75 54.750	2 118 6,964 59.00 2,000	2 80 3,328 40.00 128,000	18 942 50,520 52.33 1,222,000
400 or more	N 7 Sums 392 SS 22,060 \bar{X} 56.00 SS 108,000	5 271 15,117 54.20 428,800	9 454 23,272 50.44 370,222	3 155 8,059 51.67 50.667	15 800 43,432 53.33 765.333

SUMMARY OF ANALYSIS OF VARIANCE

Source of Variation	df	S.S.	M.S.	F	F ₀₅	F ₀₁	Hypothesis
H.S. Size of Origin	2	53.612	26.806				Accepted
Groups	4	46.539	11.634				Accepted
Interaction	8	336.826	42.103				Accepted
Within	217	9,539.275	43.959				Accepted

TABLE VIII
SUMS, SUMS OF SQUARES AND REDUCTION DATA FOR EACH OF THE EXPERIMENTAL
GROUPS ON THE LANGUAGE KNOWLEDGE TEST WHEN CLASSIFIED BY SIZE
OF HIGH SCHOOL OF ORIGIN

Size of High School Origin	Group A	Group B	Group C	Group D	Group E
0 - 199	N 25 Sums 710 SS 20,862 \bar{X} 28.40 ss 698.000	29 898 29,550 30.96 1,742.966	21 704 24,540 33.52 939.238	21 700 24,094 33.33 760.667	61 2,006 69,190 32.88 3,222.197
200 - 399	N 7 Sums 214 SS 6,930 \bar{X} 30.57 ss 387.714	4 133 4,521 33.25 98.750	2 80 3,328 40.00 128.000	5 179 6,511 35.80 102.800	18 635 23,431 35.27 1,029.611
400 or more	N 7 Sums 221 SS 7,217 \bar{X} 31.57 ss 239.714	5 176 6,270 35.20 74.800	9 267 8,029 29.67 106.000	3 103 5,585 34.33 48.667	15 482 16,512 32.13 1,023.733

SUMMARY OF ANALYSIS OF VARIANCE

Source of Variation	df	S.S.	M.S.	F	F ₀₅	F ₀₁	Hypothesis
H.S. Size of Origin	2	186.395	93.197	1.907	3.04	4.71	Accepted
Groups	4	251.590	62.897	1.287	2.41	3.41	Accepted
Interaction	8	342.960	42.870				Accepted
Within	217	10,604.857	48.870				Accepted

TABLE IX
SUMS, SUMS OF SQUARES AND REDUCTION DATA FOR EACH OF THE EXPERIMENTAL
GROUPS ON THE IOWA READING TESTS WHEN CLASSIFIED BY
FATHER'S OCCUPATION

Father's Occupation	Group A	Group B	Group C	Group D	Group E
Group 1 - Farming	N 9 Sums 1,677 SS 313,181 X 186.33 ss 700.000	15 2,775 515,431 185.00 2,056.000	14 2,613 489,671 186.64 1,973.214	11 2,051 384,005 186.45 1,586.727	25 4,641 864,133 185.64 2,577.760
Group 2 - Mechanical	N 5 Sums 947 SS 179,731 X 189.40 ss 369.200	6 1,102 202,932 183.66 531.333	2 378 71,642 189.00 200.000	9 1,669 310,323 185.44 816.222	16 2,930 539,206 183.12 2,649.750
Group 3 - Professional	N 8 Sums 1,522 SS 290,134 X 190.25 ss 573.500	4 765 146,555 191.25 248.750	2 360 65,250 180.00 1450.000	3 557 103,697 185.66 280.667	13 2,479 473,385 190.69 658.769
Group 4 - Services	N 5 Sums 938 SS 177,238 X 187.60 ss 1,269.200	6 1,138 216,280 189.66 139.333	7 1,303 243,745 186.14 1,200.857	5 990 196,204 198.00 184.000	12 2,262 428,196 188.50 1,809.000
Group 5 - Miscellaneous	N 8 Sums 1,409 SS 250,211 X 176.12 ss 2,050.875	6 1,097 201,009 182.83 440.833	4 744 139,650 186.00 1,266.000	9 1,673 312,413 185.89 1,420.889	28 5,009 902.551 178.89 6,476.679

TABLE IX A
SUMMARY OF ANALYSIS OF VARIANCE

Source of Variation	df	S.S.	M.S.	F	F ₀₅	F ₀₁	Hypothesis
Occupations	4	1,021.632	255.408	1.640	2.41	3.41	Accepted
Groups	4	165.080	41.270				Accepted
Interaction	16	1,571.914	98.244				Accepted
Within	207	32,229.540	155.698				

TABLE X
SUMS, SUMS OF SQUARES AND REDUCTION DATA FOR EACH OF THE EXPERIMENTAL
GROUPS ON THE WRITING PROFICIENCY TEST WHEN CLASSIFIED BY
FATHER'S OCCUPATION

Father's Occupation	Group A	Group B	Group C	Group D	Group E
Group 1 - Farming	N 9 Sums 586 SS 39,320 X 65.11 ss 1,164.889	N 15 968 68,442 64.53 5,973.733	N 14 1,026 76,650 73.28 1,458.857	N 11 770 55,296 70.00 1,396.000	N 25 1,803 136,049 72.12 6,016.640
Group 2 - Mechanical	N 5 Sums 333 SS 22,681 X 66.60 ss 503.200	N 6 403 28,255 67.16 1,186.833	N 2 11,492 75.00 242.000	N 9 620 44,708 68.88 1,996.889	N 16 1,080 77,188 67.50 4,288.000
Group 3 - Professional	N 8 Sums 511 SS 34,597 X 63.87 ss 1,956.875	N 4 317 25,389 79.25 266.750	N 2 173 15,005 86.50 40.500	N 3 178 11,220 59.33 658.667	N 13 937 69,917 72.07 2,380.923
Group 4 - Services	N 5 Sums 330 SS 22,196 X 66.00 ss 416.000	N 6 405 27,615 67.50 277.500	N 7 108 2,251.429	N 5 409 34,453 81.80 996.800	N 12 820 58,940 68.33
Group 5 - Miscellaneous	N 8 Sums 588 SS 44,840 X 73.50 ss 1,622.000	N 6 456 36,208 76.00 1,552.000	N 4 253 16,251 63.25 248.750	N 9 654 50,292 72.67 2,768.000	N 28 2,020 153,540 72.14 7,811.429

TABLE X A
SUMMARY OF ANALYSIS OF VARIANCE

Source of Variation	df	S.S.	M.S.	F	F ₀₅	F ₀₁	Hypothesis
Occupations	4	348.909	87.227				Accepted
Groups	4	350.963	87.740				Accepted
Interaction	16	5,521.187	345.074	1.417	1.69	2.09	Accepted
Within	207	50,381.331	243.388				Accepted

TABLE XI
SUMS, SUMS OF SQUARES AND REDUCTION DATA FOR EACH OF THE EXPERIMENTAL
GROUPS ON THE LISTENING TEST WHEN CLASSIFIED BY
FATHER'S OCCUPATION

Father's Occupation	Group A	Group B	Group C	Group D	Group E
Group 1 - Farming	N Sums SS X ss	9 450 22,964 50.00 464.000	15 817 45,265 54.46 765.733	14 769 42,943 54.92 702.929	11 599 32,975 54.45 356.727
Group 2 - Mechanical	N Sums SS X ss	5 289 16,849 57.80 144.800	6 309 16,023 51.50 109.500	2 116 6,730 58.00 2.000	9 495 27,685 55.00 460.000
Group 3 - Professional	N Sums SS X ss	8 413 21,537 51.62 215.875	4 227 13,127 56.75 244.750	2 112 6,322 56.00 50.000	3 186 11,558 62.00 26.000
Group 4 - Service	N Sums SS X ss	5 263 14,071 52.60 237.200	6 323 17,495 53.83 106.833	7 371 19,747 53.00 84.000	5 296 17,598 59.20 74.800
Group 5 - Miscellaneous	N Sums SS X ss	8 443 24,707 55.37 175.875	6 322 17,642 53.67 361.333	4 213 11,505 53.25 162.750	9 478 25,612 53.11 224.889
					16 823 43,815 51.43 1,481.937
					13 680 35,888 52.30 318.769
					12 659 36,483 54.91 292.917
					28 1,466 77,848 52.36 1,092.429

TABLE XI A
SUMMARY OF ANALYSIS OF VARIANCE

Source of Variation	df	S.S.	M.S.	F	F ₀₅	F ₀₁	Hypothesis
Occupations	4	104.731	26.182				Accepted
Groups	4	270.003	67.500	1.539	2.41	3.41	Accepted
Interaction	16	685.931	42.870				Accepted
Within	207	9,073.486	43.833				Accepted

TABLE XII
SUMS, SUMS OF SQUARES AND REDUCTION DATA FOR EACH OF THE EXPERIMENTAL
GROUPS ON THE LANGUAGE KNOWLEDGE TEST WHEN CLASSIFIED BY
FATHER'S OCCUPATION

Father's Occupation	Group A	Group B	Group C	Group D	Group E
Group 1 - Farming	N 9 Sums 251 SS 7,267 X̄ 27.88 ss 266.889	N 15 Sums 493 SS 17,443 X̄ 32.86 ss 1,239.733	N 14 Sums 491 SS 17,967 X̄ 35.07 ss 746.929	N 11 Sums 375 SS 13,019 X̄ 34.09 ss 234.909	N 25 Sums 827 SS 28,549 X̄ 33.08 ss 1,191.840
Group 2 - Mechanical	N 5 Sums 151 SS 4,663 X̄ 30.20 ss 102.800	N 6 Sums 166 SS 4,806 X̄ 27.66 ss 213.333	N 2 Sums 77 SS 3,025 X̄ 38.50 ss 60.500	N 9 Sums 301 SS 10,515 X̄ 33.44 ss 448.222	N 16 Sums 523 SS 17,981 X̄ 32.68 ss 885.438
Group 3 - Professional	N 8 Sums 260 SS 8,746 X̄ 32.50 ss 296.000	N 4 Sums 126 SS 4,070 X̄ 31.50 ss 101.000	N 2 Sums 67 SS 2,285 X̄ 33.50 ss 40.500	N 3 Sums 112 SS 4,320 X̄ 37.33 ss 138.667	N 13 Sums 438 SS 14,934 X̄ 33.69 ss 176.769
Group 4 - Services	N 5 Sums 128 SS 3,368 X̄ 25.60 ss 91.200	N 6 Sums 183 SS 5,567 X̄ 30.50 ss 85.500	N 7 Sums 205 SS 6,161 X̄ 29.28 ss 157.429	N 5 Sums 175 SS 6,199 X̄ 35.00 ss 74.000	N 12 Sums 421 SS 15,589 X̄ 35.08 ss 618.917
Group 5 - Miscellaneous	N 8 Sums 227 SS 6,657 X̄ 28.37 ss 215.875	N 6 Sums 199 SS 6,755 X̄ 33.17 ss 154.833	N 4 Sums 123 SS 3,843 X̄ 30.75 ss 60.750	N 9 Sums 275 SS 8,661 X̄ 30.56 ss 258.222	N 28 Sums 914 SS 32,080 X̄ 32.64 ss 2,244.429

TABLE XII A
SUMMARY OF ANALYSIS OF VARIANCE

Source of Variation	df	S.S.	M.S.	F	F ₀₅	F ₀₁	Hypothesis
Occupations	4	147.734	36.933				Accepted
Groups	4	552.694	138.173	2.775	2.41	3.41	Rejected
Interaction	16	614.768	38.423				Accepted
Within	207	10,304.682	49.781				

TABLE XIII
SUMS, SUMS OF SQUARES AND REDUCTION DATA FOR EACH OF THE EXPERIMENTAL GROUPS ON THE
IOWA READING TESTS WHEN CLASSIFIED UNDER RELATED COLLEGE MAJORS

Major Groupings	Group A	Group B	Group C	Group D	Group E
Sciences & Mathematics	N 8 Sums 1,468 SS 271,870 X 183.50 ss 2,492.000	N 9 Sums 1,707 SS 324,609 X 189.66 ss 848.000	N 4 Sums 750 SS 140,814 X 187.50 ss 189.000	N 3 Sums 587 SS 114,937 X 195.66 ss 80.667	N 10 Sums 350,996 SS 187.20 X 557.600
Social Sciences & Business Administration	N 6 Sums 1,102 SS 203,216 X 183.66 ss 815,333	N 4 Sums 781 SS 152,763 X 195.25 ss 272.750	N 6 Sums 1,108 SS 206.082 X 184.66 ss 1,471.333	N 2 Sums 388 SS 75,370 X 194.00 ss 98.000	N 19 Sums 3,453 SS 631,265 X 181.73 ss 3,727.684
Humanities	N 11 Sums 2,117 SS 408,589 X 192.45 ss 1,162.727	N 5 Sums 918 SS 168,720 X 183.60 ss 178.200	N 9 Sums 1,656 SS 306.26 X 184.00 ss 1,722.000	N 8 Sums 1,495 SS 280,469 X 136.87 ss 1,090.875	N 22 Sums 4,024 SS 739,186 X 182.90 ss 3,159.818
Agriculture	N 2 Sums 338 SS 57,140 X 169.00 ss 18.000	N 6 Sums 1,085 SS 197,039 X 180.83 ss 834.833	N 4 Sums 765 SS 146,397 X 191.25 ss 90.750	N 8 Sums 1,437 SS 258,579 X 179.62 ss 1457.875	N 6 Sums 1,129 SS 212.715 X 188.16 ss 274.833
Unclassified	N 5 Sums 928 SS 172,482 X 185.60 ss 245.200	N 6 Sums 1,061 SS 188,075 X 176.83 ss 454.833	N 3 Sums 581 SS 113,531 X 193.66 ss 1,010.667	N 2 Sums 394 SS 77,618 X 197.00 ss 0.000	N 11 Sums 1,990 SS 362,052 X 180.90 ss 2,042.909
Miscellaneous	N 7 Sums 1,290 SS 238,066 X 184.28 ss 317.429	N 7 Sums 1,325 SS 251,001 X 189.28 ss 197.429	N 6 Sums 1,076 SS 193,770 X 179.33 ss 807.333	N 7 Sums 1,351 SS 261,739 X 193.00 ss 996.000	N 26 Sums 4,853 SS 911,257 X 186.65 ss 5,125.865

TABLE XIII A
SUMMARY OF ANALYSIS OF VARIANCE

Source of Variation	df	S.S.	M.S.	F	F ₀₅	F ₀₁	Hypothesis
Major Groupings	5	758.113	151.622				Accepted
Groups	4	1,123.157	280.789	1.826	2.41	3.41	Accepted
Interaction	20	4,042.944	202.147	1.314	1.62	1.97	Accepted
Within	202	31,059.963	153.762				Accepted

TABLE XIV
SUMS, SUMS OF SQUARES AND REDUCTION DATA FOR EACH OF THE EXPERIMENTAL GROUPS ON THE
WRITING PROFICIENCY TEST WHEN CLASSIFIED UNDER RELATED COLLEGE MAJORS

Major Groupings	Group A	Group B	Group C	Group D	Group E
Sciences & Mathematics	N 8 Sums 600 SS 45,410 X 75.00 Ss 410.000	9 628 45,720 69.77 1,899.556	4 272 18,730 68.00 234.000	3 248 21,536 82.66 1,034.667	10 763 59,047 76.30 830.100
Social Sciences & Business Administration	N 6 Sums 390 SS 26,080 X 65.00 Ss 730.00	4 286 21,898 71.50 1,449.000	6 403 28,883 67.16 1,814.833	2 164 13,466 82.00 18.000	19 1,296 94,564 68.21 6,163.158
Humanities	N 11 Sums 796 SS 59,388 X 72.36 Ss 1,786.545	5 358 26,254 71.60 621.200	9 669 51,175 74.33 1,446.000	8 572 42,020 71.50 1,122.000	22 1,513 109,193 68.77 5,139.864
Agriculture	N 2 Sums 112 SS 6,322 X 56.00 Ss 50.000	6 328 20,036 54.66 2,105.333	4 271 20,227 67.75 1,866.750	8 497 32,527 62.12 1,650.875	6 393 27,707 65.50 1,965.500
Unclassified	N 5 Sums 304 SS 19,004 X 60.80 Ss 520.800	6 409 29,875 68.16 1,994.833	3 215 16,093 71.66 684.667	2 168 14,400 84.00 288.000	11 745 53,153 67.72 2,696.182
Miscellaneous	N 7 Sums 420 SS 26,468 X 60.00 Ss 1,268.000	7 540 42,126 77.14 468.857	6 412 28,506 68.67 215.333	7 476 34,800 68.00 2,432.000	26 1,950 151,970 75.00 5,720.000

TABLE XIV A
SUMMARY OF ANALYSIS OF VARIANCE

Source of Variation	df	S.S.	M.S.	F	F ₀₅	F ₀₁	Hypothesis
Major Groupings	5	2,591.704	518.340	2.153	2.26	3.11	Accepted
Groups	4	1,660.092	415.023	1.724	2.41	3.41	Accepted
Interaction	20	1,477.995	23.899				Accepted
Within	202	48,626.053	240.723				

TABLE XV
SUMS, SUMS OF SQUARES AND REDUCTION DATA FOR EACH OF THE EXPERIMENTAL GROUPS ON THE
LISTENING TEST WHEN CLASSIFIED UNDER RELATED COLLEGE MAJORS

Major Groupings	Group A	Group B	Group C	Group D	Group E
Sciences & Mathematics	N 8 Sums 454 SS 25,900 \bar{X} 56.75 ss 135.500	N 9 Sums 519 SS 30,297 \bar{X} 57.66 ss 368.000	N 4 Sums 226 SS 12,810 \bar{X} 56.50 ss 41.000	N 3 Sums 170 SS 9,666 \bar{X} 56.55 ss 32.667	N 10 Sums 529 SS 29,009 \bar{X} 52.90 ss 1,024.900
Social Sciences & Business Administration	N 6 Sums 329 SS 18,103 \bar{X} 54.83 ss 62.833	N 4 Sums 209 SS 11,197 \bar{X} 52.25 ss 276.750	N 6 Sums 341 SS 19,479 \bar{X} 56.83 ss 98.833	N 2 Sums 122 SS 7,444 \bar{X} 61.00 ss 2,000	N 19 Sums 984 SS 51,882 \bar{X} 51.78 ss 921.158
Humanities	N 11 Sums 610 SS 34,328 \bar{X} 55.45 ss 500.727	N 5 Sums 272 SS 14,970 \bar{X} 54.40 ss 173.200	N 9 Sums 496 SS 27,738 \bar{X} 55.11 ss 402.889	N 8 Sums 439 SS 24,277 \bar{X} 54.87 ss 186.875	N 22 Sums 1,159 SS 61,725 \bar{X} 52.68 ss 666.773
Agriculture	N 2 Sums 100 SS 5,072 \bar{X} 50.00 ss 72.000	N 6 Sums 299 SS 15,295 \bar{X} 49.83 ss 394.833	N 4 Sums 192 SS 9,322 \bar{X} 48.00 ss 106.000	N 8 Sums 420 SS 22,448 \bar{X} 52.50 ss 398.000	N 6 Sums 314 SS 16,548 \bar{X} 52.33 ss 155.33
Unclassified	N 5 Sums 265 SS 14,083 \bar{X} 53.00 ss 38.000	N 6 Sums 320 SS 17,090 \bar{X} 53.33 ss 23.333	N 3 Sums 147 SS 7,259 \bar{X} 49.00 ss 56.000	N 2 Sums 118 SS 6,980 \bar{X} 59.00 ss 18.000	N 11 Sums 582 SS 31,122 \bar{X} 52.90 ss 328.909
Miscellaneous	N 7 Sums 329 SS 15,837 \bar{X} 47.00 ss 110.000	N 7 Sums 379 SS 20,703 \bar{X} 54.14 ss 182.857	N 6 Sums 318 SS 17,114 \bar{X} 53.00 ss 260.000	N 7 Sums 417 SS 24,943 \bar{X} 59.57 ss 101.714	N 26 Sums 1,402 SS 76,704 \bar{X} 53.92 ss 1,103.846

TABLE XV A
SUMMARY OF ANALYSIS OF VARIANCE

Source of Variation	df	S.S.	M.S.	F	F ₀₅	F ₀₁	Hypothesis
Major Groupings	5	493.015	98.603	2.428	2.26	3.11	Rejected
Groups	4	454.737	113.684	2.800	2.41	3.41	Rejected
Interaction	20	693.034	34.651				Accepted
Within	202	8,202.930	40.608				

TABLE XVI
SUMS, SUMS OF SQUARES AND REDUCTION DATA FOR EACH OF THE EXPERIMENTAL GROUPS ON THE
LANGUAGE KNOWLEDGE TEST WHEN CLASSIFIED BY RELATED COLLEGE MAJORS

Major Groupings	Group A	Group B	Group C	Group D	Group E
Sciences & Mathematics	N 8 Sums 254 SS 8,230 \bar{X} 31.75 ss 165.500	N 9 Sums 319 SS 11,779 \bar{X} 35.44 ss 472.222	N 4 Sums 141 SS 5,005 \bar{X} 35.25 ss 34.750	N 3 Sums 113 SS 4,357 \bar{X} 37.66 ss 100.667	N 10 Sums 347 SS 12,367 \bar{X} 34.70 ss 326.100
Social Sciences & Business Administration	N 6 Sums 176 SS 5,582 \bar{X} 29.33 ss 419.33	N 4 Sums 151 SS 5,785 \bar{X} 37.75 ss 84.750	N 6 Sums 220 SS 8,568 \bar{X} 36.66 ss 501.333	N 2 Sums 76 SS 2,986 \bar{X} 38.00 ss 98.000	N 19 Sums 603 SS 20,369 \bar{X} 31.73 ss 1,231.684
Humanities	N 11 Sums 338 SS 10,790 \bar{X} 30.72 ss 404.182	N 5 Sums 149 SS 4,587 \bar{X} 29.80 ss 146.800	N 9 Sums 307 SS 10,825 \bar{X} 34.11 ss 352.889	N 8 Sums 275 SS 9,617 \bar{X} 34.37 ss 163.875	N 22 Sums 710 SS 23,946 \bar{X} 32.27 ss 1,032.364
Agriculture	N 2 Sums 51 SS 1,341 \bar{X} 25.50 ss 40.500	N 6 Sums 174 SS 5,386 \bar{X} 29.00 ss 310.000	N 4 Sums 117 SS 3,487 \bar{X} 29.25 ss 64.750	N 8 Sums 245 SS 7,653 \bar{X} 30.62 ss 149.875	N 6 Sums 188 SS 6,046 \bar{X} 31.33 ss 155.333
Unclassified	N 5 Sums 125 SS 3,273 \bar{X} 25.00 ss 148.000	N 6 Sums 153 SS 4,013 \bar{X} 25.50 ss 111.500	N 3 Sums 91 SS 2,793 \bar{X} 30.33 ss 32.667	N 2 Sums 62 SS 2,050 \bar{X} 31.00 ss 128.000	N 11 Sums 372 SS 13,634 \bar{X} 33.81 ss 1,053.810
Miscellaneous	N 7 Sums 201 SS 5,793 \bar{X} 28.71 ss 21.429	N 7 Sums 221 SS 7,192 \bar{X} 31.57 ss 213.714	N 6 Sums 175 SS 5,219 \bar{X} 29.17 ss 114.833	N 7 Sums 251 SS 9,127 \bar{X} 35.86 ss 126.857	N 26 Sums 903 SS 32,771 \bar{X} 34.73 ss 1,409.115

TABLE XVI A
SUMMARY OF ANALYSIS OF VARIANCE

Source of Variation	df	S.S.	M.S.	F	F ₀₅	F ₀₁	Hypothesis
Major Groupings	5	846.394	169.278	3.545	2.26	3.11	Rejected
Groups	4	641.917	160.497	3.361	2.41	3.41	Rejected
Interaction	20	475.459	23.773				Accepted
Within	202	9,644.658					

TABLE XVII
SUMS, SUMS OF SQUARES AND REDUCTION DATA OF THE SCORES OF THE EXPERIMENTAL GROUPS ON THE
IOWA READING TEST WHEN GROUPED BY VOCATIONAL-PROFESSIONAL PLANS

Vocational-Professional Plans	Group A	Group B	Group C	Group D	Group E
Teaching	N 17	15	16	12	30
	Sums 3,221	2,805	2,927	2,244	5,535
	SS 612,453	525,323	538,867	421,018	1,026,653
X	189.47	187.00	182.93	187.00	184.50
ss	2,168.235	788.000	3,408.938	1,390.000	5,445.500
Professions	N 8	3	3	3	22
Private busi-Sums	1,429	580	581	566	4,035
ness, self-SS	257,435	112,158	112,973	107,138	745,173
employed & X	178.62	193.33	193.66	188.66	183.40
Government ss	2,089.875	24.667	452.667	352.667	5,117.318
Housewife	N 10	13	8	9	28
Travel & Sums	1,868	2,365	1,504	1,689	5,116
Undecided SS	349,686	432,623	283,962	318,245	938,974
X	186.80	181.92	188.00	187.66	182.71
ss	743.600	2,374.923	1,210.000	1,276.000	4,207.714
Miscellaneous	N 3	5	3	7	
	Sums 559	948	565	398	1,330
	SS 104,323	180,152	106,557	79,234	253,070
X	186.33	189.60	188.33	199.00	190.00
ss	162.667	411.200	148.667	32.000	370.000

SUMMARY OF ANALYSIS OF VARIANCE

Source of Variance	df	S.S.	M.S.	F	F ₀₅	F ₀₁	Hypothesis
Plans	3	466.052	155.350				Accepted
Groups	4	478.751	119.687				Accepted
Interaction	12	1,402.474	116.872				Accepted
Within	197	32,174.638	163.323				Accepted

TABLE XVIII
SUMS, SUMS OF SQUARES AND REDUCTION DATA OF THE SCORES OF THE EXPERIMENTAL GROUPS ON THE
WRITING PROFICIENCY TEST WHEN CLASSIFIED BY VOCATIONAL-PROFESSIONAL PLANS

Vocational- Professional Plans	Group A	Group B	Group C	Group D	Group E
Teaching	N 17	15	16	12	30
	Sums 1,200	1,115	1,163	810	2,158
	SS 87.442	84.639	86.923	56.960	161.504
	X 70.58	74.33	72.68	67.50	71.93
	ss 2,736.118	1,757.333	2,387.438	2,285.000	6,271.867
Professions,	N 8	3	3	3	22
Private busi-Sums	539	269	238	254	1,628
ness, Self- employed &	SS 37.515	24.161	19.330	21.908	126,036
	X 67.37	89.66	79.33	84.66	74.00
Government	ss 1,199.875	40.667	448.667	402.667	5,564.000
Housewife,	N 10	13	8	9	28
	Sums 634	806	545	639	1,862
	SS 41.484	53.408	39.215	49.223	130,248
Travel & Undecided	X 63.40	62.00	68.12	71.00	66.50
	ss 1,288.400	3,436.000	2,086.875	3,854.000	6,425.000
Miscellaneous	N 3	5	3	2	7
	Sums 188	325	185	148	553
	SS 12,510	22,935	11,441	11,152	45,759
	X 62.66	65.00	61.66	74.00	79.00
	ss 728.667	1,810.000	32.667	200.000	2,072.000

SUMMARY OF ANALYSIS OF VARIANCE

Source of Variation	df	S.S.	M.S.	F	F ₀₅	F ₀₁	Hypothesis
Plans	3	2,719.419	906.473	3.965	2.65	3.88	Rejected
Groups	4	984.349	246.087	1.076	2.41	3.41	Accepted
Interaction	12	2,617.569	218.131				Accepted
Within	197	45,027.241	228.564				

TABLE XIX
SUMS, SUMS OF SQUARES AND REDUCTION DATA OF THE SCORES OF THE EXPERIMENTAL GROUPS ON THE
LISTENING TEST WHEN CLASSIFIED BY VOCATIONAL-PROFESSIONAL PLANS

Vocational- Professional Plans	Group A	Group B	Group C	Group D	Group E
Teaching	N Sums SS \bar{X} ss	17 918 50,616 54.00 1,044.000	15 846 48,098 56.40 383.600	16 862 47,166 53.87 725.750	12 663 36,947 55.25 316.250
Professions	N Private Busi- ness, Self- employed & Government	3 430 23,342 53.75 229.500	3 172 9,880 57.33 18.667	3 171 9,809 57.00 62.000	3 178 10,602 59.33 40.667
Housewife	N Travel & Undecided	10 512 26,386 51.20 171.600	13 680 36,398 52.30 828.769	8 417 22,035 52.12 298.875	9 515 29,597 57.22 127.556
Miscellaneous	N Sums SS \bar{X} ss	2 171 9,843 57.00 96.000	5 265 14,419 53.00 374.000	3 172 9,902 57.33 40.667	7 108 5,840 54.00 8.000
SUMMARY OF ANALYSIS OF VARIANCE					
Source of Variation	df	S.S.	M.S.	F	F ₀₅ F ₀₁ Hypothesis
Plans	3	199.972	66.657	1.532	2.65 3.88 Accepted
Groups	4	96.246	24.061		Accepted
Interaction	12	358.897	29.908		Accepted
Within	197	8,570.501	43.505		Accepted

TABLE XX
SUMS, SUMS OF SQUARES AND REDUCTION DATA OF THE SCORES OF THE EXPERIMENTAL GROUPS ON THE
LANGUAGE KNOWLEDGE TEST WHEN CLASSIFIED BY VOCATIONAL-PROFESSIONAL PLANS

Vocational- Professional Plans	Group A	Group B	Group C	Group D	Group E
Teaching	N Sums SS \bar{X} ss	17 520 16,354 30.58 418.118	15 473 15,299 31.53 383.733	16 517 17,359 32.31 653.438	12 416 14,764 34.66 342.667
Professions,	N Private busi- ness, Self- employed & Government	8 222 6,292 27.75 131.500	3 111 4,361 37.00 254.000	3 109 4,163 36.33 202.667	3 94 2,986 31.33 40.667
Housewife,	N Travel & Undecided	10 276 8,196 27.60 578.400	13 388 12,168 29.84 587.692	8 273 9,655 34.12 338.875	9 288 9,498 32.00 282.000
Miscellaneous	N Sums SS \bar{X} ss	3 97 3,267 32.33 130.667	5 190 7,460 38.00 240.000	3 101 3,419 33.66 18.667	2 68 2,344 34.00 32.000

SUMMARY OF ANALYSIS OF VARIANCE

Source of Variation	df	S.S.	M.S.	F	F ₀₅	F ₀₁	Hypothesis
Plans	3	205.623	68.541	1.383	2.65	3.88	Accepted
Groups	4	351.469	87.867	1.772	2.41	3.41	Accepted
Interaction	12	310.123	25.843				Accepted
Within	197	9,763.291	49.559				903.429